Summary of the February 24 Snowfall

Synopsis: A strong upper level trough moved across the central United States on Thursday and caused a powerful winter storm to develop. This resulted in numerous thunderstorms across the south and a narrow area of snowfall on the northern side of the system. As of Friday morning, there were 216 reports of severe weather near the Tennessee River Valley, while snowfall reports in southern Iowa and northern Missouri generally ranged from 3 to 6 inches (Fig 1). A well defined comma-head cloud shield shown in the Infrared satellite imagery was located across the central US (Fig 2, 3).

Winter storm warnings and advisories were in effect yesterday afternoon for several counties across southern Iowa, including Polk County. However, aside from a few flurries, no snow fell in the metro area. The reason for this was dry air which was in place at the low and mid levels. The images and captions below help to illustrate the dry air that was in place (Fig 4). This dry air caused the snow to evaporate before it reached the ground.

SNOW REPORTS SORTED BY AMOUNT

INCHES	LOCATION	ST	COUNTY	TIME
6.00	KNOXVILLE	IA	MARION	0700 AM
6.00	OSKALOOSA	IA	MAHASKA	0700 AM
6.00	BEDFORD	IA	TAYLOR	0700 AM
4.50	1 WNW BLOOMFIELD	IA	DAVIS	0700 AM
4.50	2 SW CRESTON	IA	UNION	0700 AM
4.40	BEACONSFIELD	IA	RINGGOLD	0700 AM
4.00	3 NNE ALBIA	IA	MONROE	0700 AM
4.00	OTTUMWA	IA	WAPELLO	0700 AM
4.00	RATHBUN	IA	APPANOOSE	0700 AM
4.00	1 E CHARITON	IA	LUCAS	0700 AM
3.70	SE CENTERVILLE	IA	APPANOOSE	0700 AM
3.50	NW CENTERVILLE	IA	APPANOOSE	0700 AM
3.50	4 N NEW MARKET	IA	TAYLOR	0700 AM
3.50	4 N PELLA	IA	MARION	0700 AM
3.20	2 WSW OSCEOLA	IA	CLARKE	0700 AM
3.20	ALLERTON	IA	WAYNE	0700 AM
3.10	OSCEOLA	IA	CLARKE	0700 AM
3.00	6 ESE LEON	IA	DECATUR	0700 AM
3.00	LORIMOR	IA	UNION	0700 AM
3.00	CORNING	IA	ADAMS	0700 AM
3.00	2 S BLOCKTON	IA	TAYLOR	0700 AM
2.80	MOUNT AYR	IA	RINGGOLD	0700 AM
2.00	1 W MONTEZUMA	IA	POWESHIEK	0700 AM
1.50	2 NNW WINTERSET	IA	MADISON	0700 AM
0.70	GRINNELL	IA	POWESHIEK	0700 AM

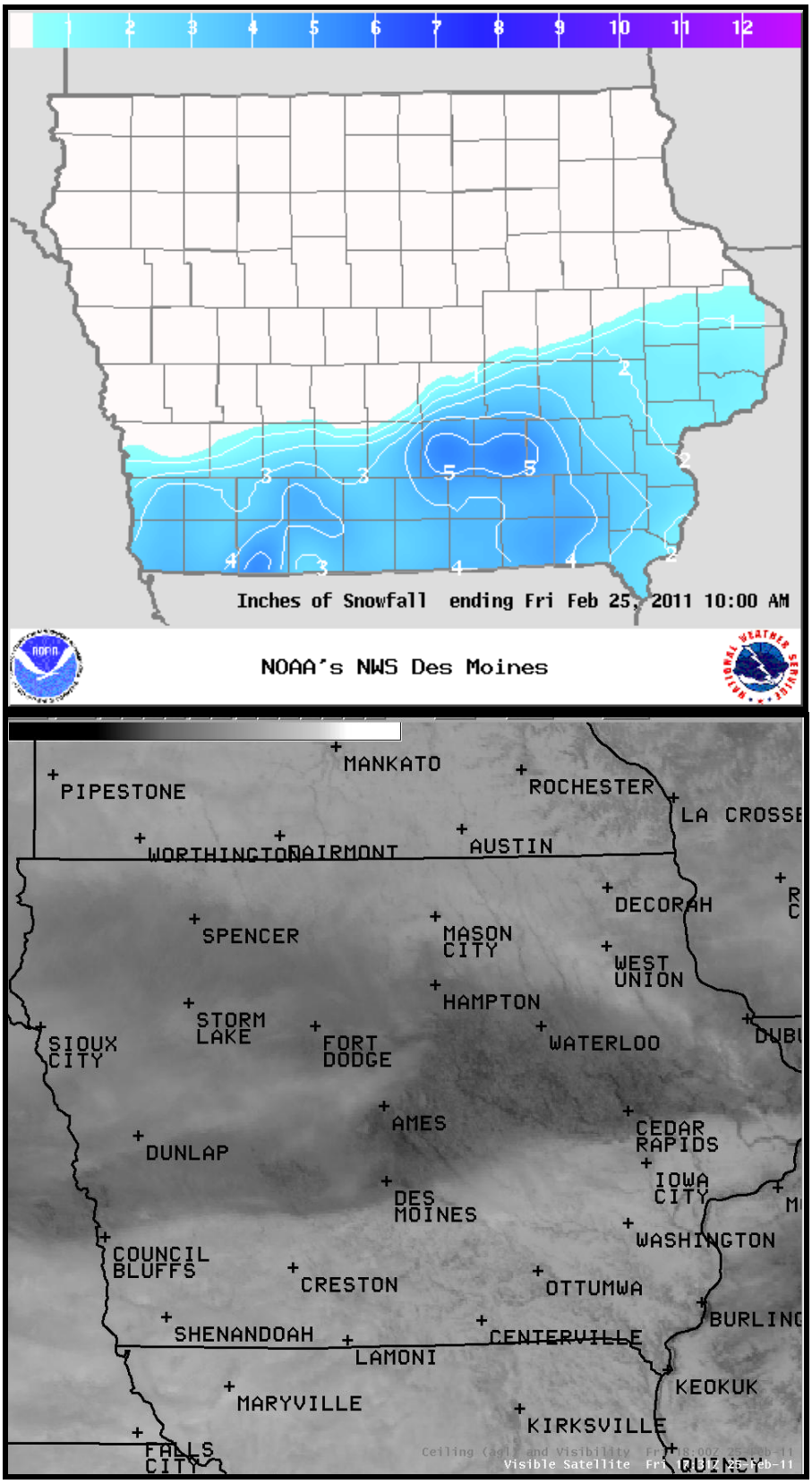

Figure 1: The top image shows a map of the snowfall observations with the totals given in the white contours. The bottom image is a visible satellite image from 1130AM Friday morning showing the snow cover across southern Iowa and northern Missouri. The accumulating snow occurred just south of a line extending from Council Bluffs through Des Moines to Cedar Rapids.

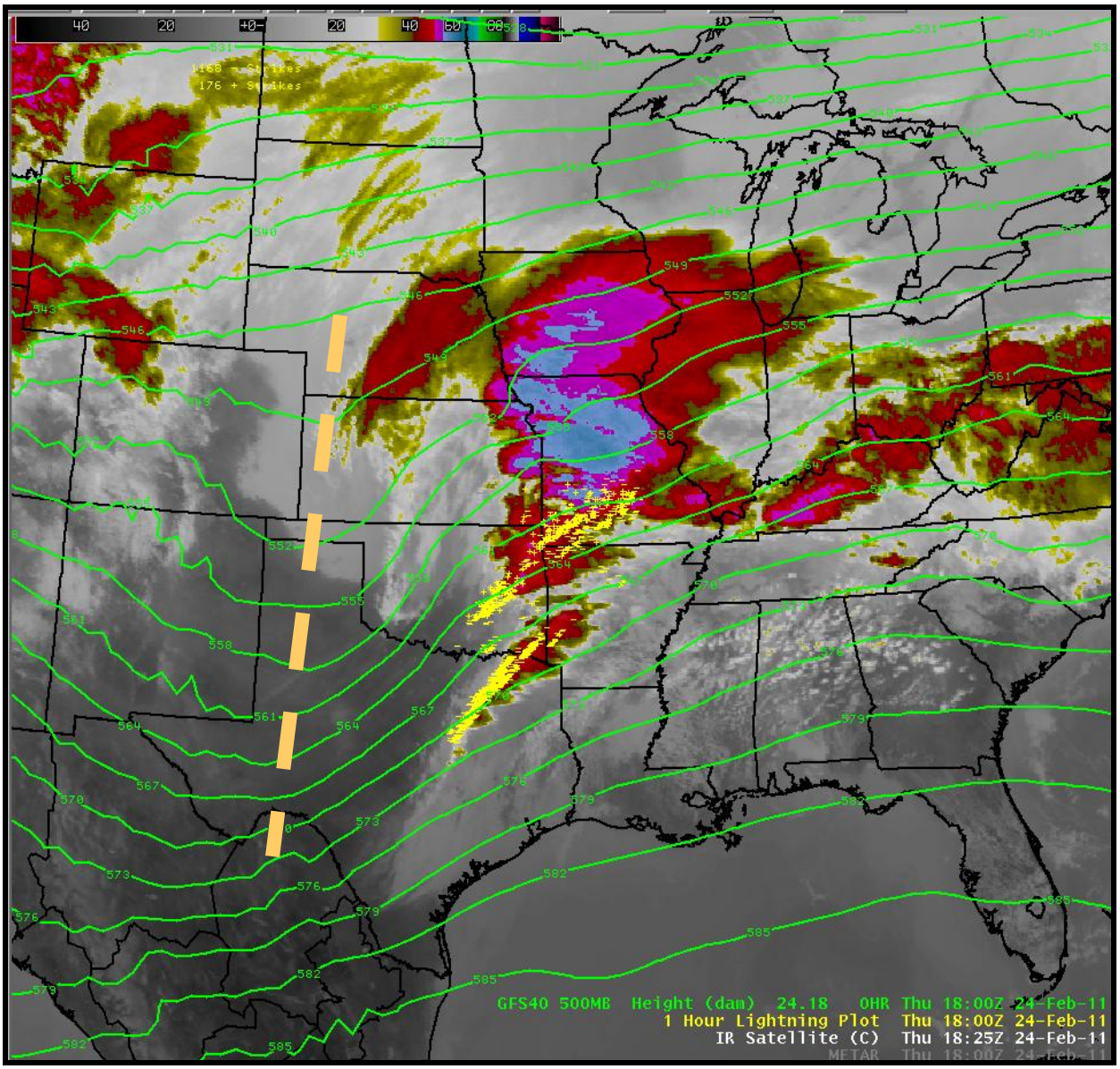

Figure 2: The figure above valid at 12PM on Thursday Feb 24th shows infrared satellite (image), along with 500mb heights (green lines), and one-hour lightning strikes (yellow). The tan dashed line indicates the upper level pressure trough. The region to the east of the trough is favorable for ascent. It is in this region where clouds associated with the powerful storm are located. These are shown by the pink and blue clouds colors, which indentify cooler (and therefore higher) cloud tops. The location of these high clouds agrees will with the 3-6 km relative humidity shown in the final figure.

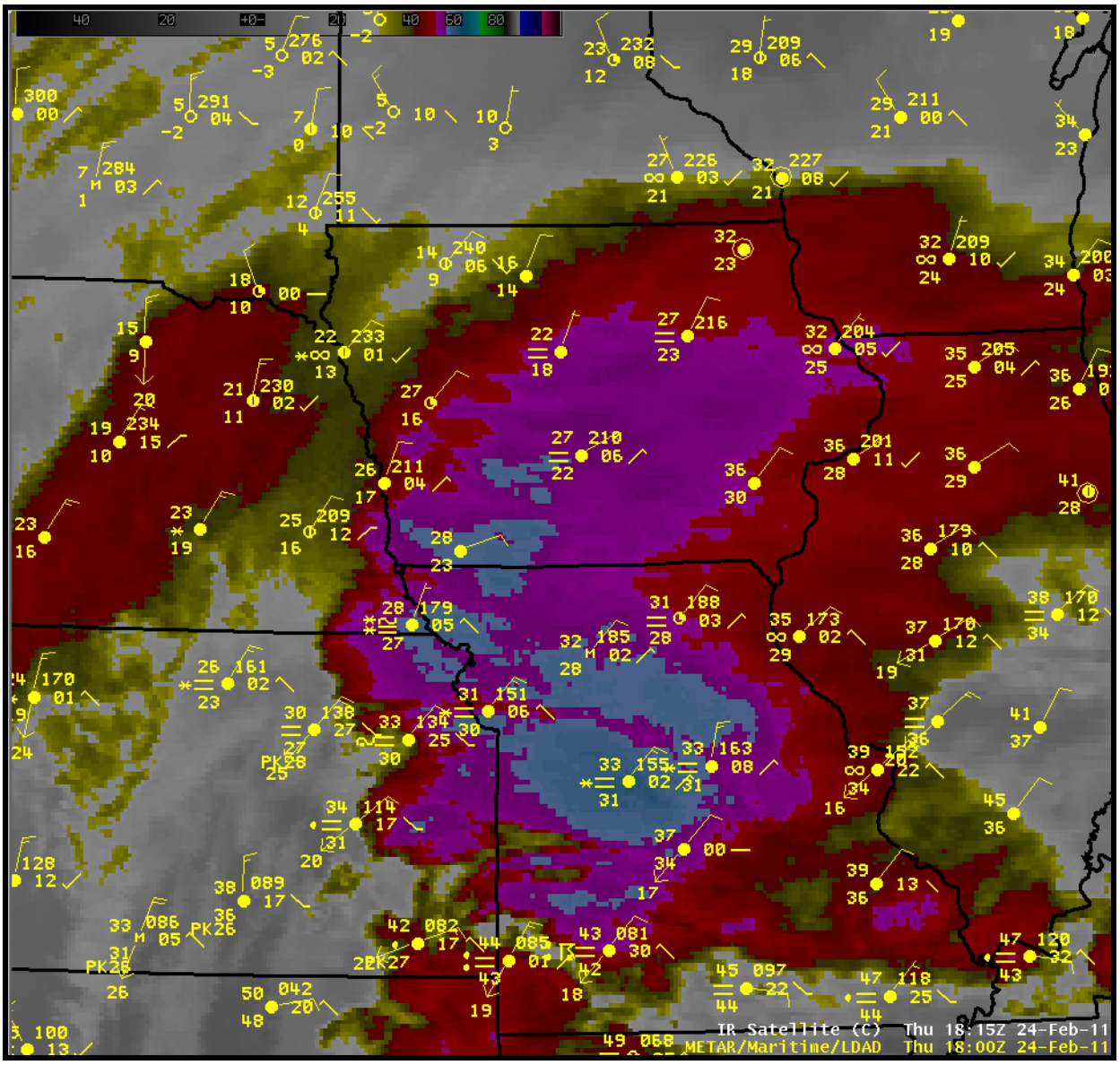

Figure 3: Zoomed-in Infrared image from the same time, 12PM Thursday February 24th, with surface observations overlaid. Notice the snowflakes across eastern Kansas and northwest Missouri, indicating the snowfall that was ongoing in this region.

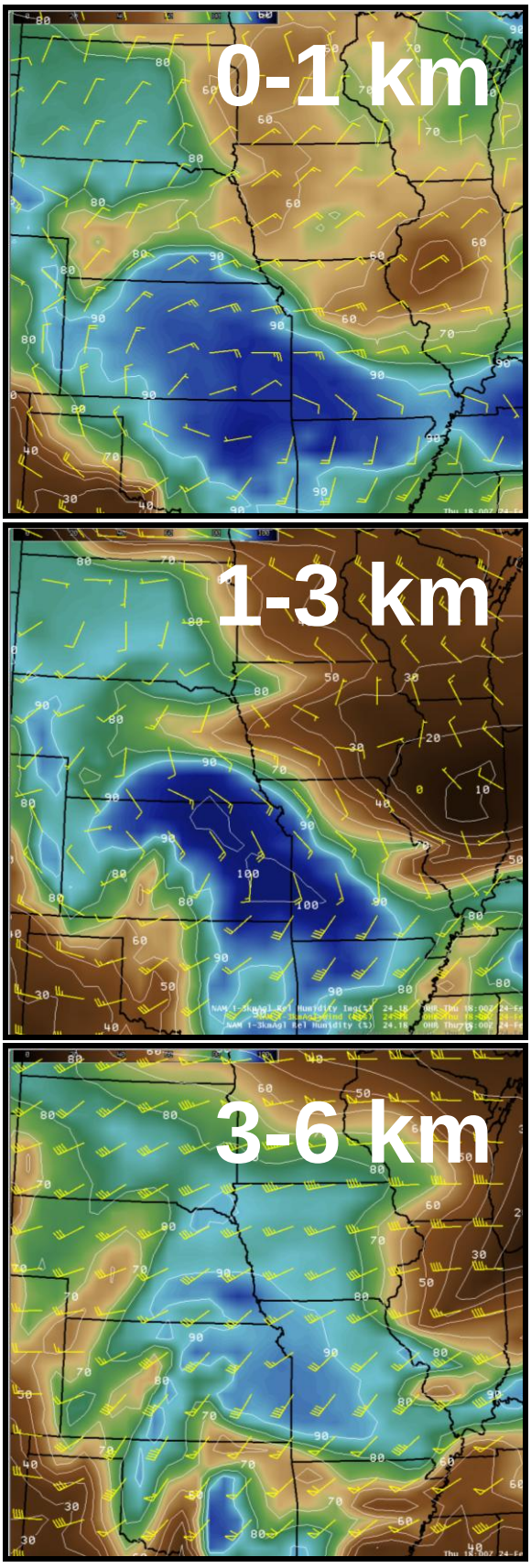

Figure 4: The images to the left tell the story. They show the Relative Humidity (fill) and winds (yellow) in the 0-1 km layer above ground level (top), 1-3 km layer (middle), and 3-6 km layer (bottom) of the atmosphere. The blue colors indicate moist air, while the tan and brown colors show air that is fairly dry. Notice how the winds in the lower levels were from the northeast and brought dry air into Iowa. However, at mid and upper levels the winds were from the southwest and brought moist air across the state. In Des Moines the dry air won out and little if any snow fell. Meanwhile in the southern part of the state 3 to 6 inches were reported.